What is claimed is:

1. A implement remote data acquisition and processing method, comprising the steps of:

(a) creating a data link between the system administrator and the central device through an appropriate communication media, wherein the data link creation follows the defined administrator-server communication mechanism;

(b) creating a data link between individual devices (instruments and facilities) and the central device server, wherein the data link creation follows the defined device-server communication mechanism;

(c) creating a data link between devices (instruments and facilities) via the central device server where information exchange is needed, wherein the data link creation follows the defined device-device communication mechanism;

(d) receiving data by the central device server data from both communicating parties, and forwarding the output stream of one device (instrument and facility) to the input stream of the other, and vise versa;

(e) being responsible by the central device server for the flow control of the communication system, including package buffering and management, package recognition and distribution, and communication status monitoring;

(f) updating a specific functional module on a specific device (instrument and facility), the central device server connects to the manufacturer's web site through an appropriate communication media, retrieves the specific package, and installs the package onto the target device (instrument and facility);

(g) performing remote data acquisition and processing, a user creates a data link with the central device server through an appropriate communication media and requests data from a specific device (instrument and facility), wherein the central device server redirects the output stream of the device (instrument and facility) to the input stream of the user;

(h) performing remote device control and configuration, a user creates a data link with the central device server through an appropriate communication media and requests data from a specific device (instrument and facility), wherein the central device server redirects the output stream of one device (instrument and facility) to the input stream of the user, and vise versa; and

(i) converting onboard devices into nodes of information source on the Internet, wherein the central device is connected to the Internet through an appropriate communication media and assigned an IP address. Different devices (instruments and facilities) are bounded to different port numbers on the central device server, therefore, commercial application on the Internet can access the information provided by these devices (instruments and facilities) by sending a request to the central device server with the specific port numbers.

2. The method, as recited in claim 1, wherein the step (a) further comprises the steps of:

(a1) calling the appropriate device driver to communicate with the appropriate communication hardware;

(a2) creating a socket through the selected communication media with the appropriate address and port number;

(a3) issuing by the central device server a request to verify the identity of the communication party, for example, a login name and password;

(a4) submitting the personal identification information to the central device server for approval; and

(a5) successfully establishing the data link.

3. The method, as recited in claim 2, wherein the step (b) further comprises the steps of:

(b1) issuing by the system administrator an instruction to the central device server through an appropriate data link, wherein the instruction contains the type and address of the hardware interface the specific device (instrument and facility);

(b2) calling by the central device server the appropriate device driver to initiate a connection to the specific device (instrument and facility);

(b3) adding by the central device server the specific device (instrument and facility) to its device list when the connection is successfully; and

(b4) establishing the data link successfully.

4. The method, as recited in claim 3, wherein the step (c) further comprises the steps of:

(c1) issuing by the system administrator an instruction to the central device server through an appropriate data link, wherein the instruction contains the type and address of the hardware interface the specific devices (instruments and facilities);

(c2) checking out by the central device server the input stream and output stream of the specific devices (instruments and facilities) from its device list;

(c3) redirecting by the central device server the input stream and output stream of the specific devices (instruments and facilities) to each other; and

(c4) establishing the data link successfully.

5. The method, as recited in claim 4, wherein the devices (instruments and facilities) support the unique interface: Java.

6. The method, as recited in claim 5, where certain functional module on the devices (instruments and facilities) can be upgraded during runtime.

7. The method, as recited in claim 6, where the functional module to be upgraded during runtime can be implemented with either C/C++ dynamic linked library or Java class loader.

8. The method, as recited in claim 7, further comprising the following steps for upgrading a functional module during runtime:

(8.1) issuing by the system administrator an instruction to the central device server through an appropriate data link, wherein the instruction contains name of the device and the functional module to be upgraded;

(8.2) performing the central device server a query in its database for an instructions to carry out the upgrade;

(8.3) according to the instructions given by the query result, connecting the central device server to the manufacturer's web site (or other upgrading hosts) through an appropriate communication media;

(8.4) according to the instructions given by the query result, retrieving by the central device server the appropriate upgrading package from the manufacturer's web site (or other upgrading hosts);

(8.5) sending the central device server and instruction to the specific device (instrument and facility) through the data link to stop the currently running functional module;

(8.6) according to the instructions given by the query result, transferring by the central device server the package retrieved from the manufacturer's web site (or other upgrading hosts) to the device (instrument and facility) through the data link and save it at the appropriate place, wherein the operation over-writes the existing functional module on the device (instrument and facility);

(8.7) according to the instructions given by the query result, sending by the central device server a command to the device (instrument and facility) through the data link to start the new functional module; and

(8.8) installing a new functional module successfully.

9. The method, as recited in claim 8, wherein the central device server utilizes a message manager to control the information flow.

10. The method, as recited in claim 9, wherein message manager follows the following steps in managing the information exchange process:

(10.1) buffering all messages in an array of message queues according to message type (priority);

(10.2) sorting all the message queues according to message type (priority):

(10.3) processing each message queue according to their priority; and

(10.4) processing each message in a message queue in a First In First Out (FIFO) manner.

Java Based Information Exchange Process and System Thereof

Abstract of Disclosure

A method and system for remote data acquisition and processing, remote device control and configuration, information sharing between multiple devices (instruments and facilities), and remote device maintenance and upgrading. In fact, the networked devices (instruments and facilities) can be turned into nodes of information source in the Internet, and the information accumulated by these devices (instruments and facilities) is accessible to commercial applications via the Internet. Under this innovative structure each device (instrument and facility) supports the unique interface: Java. All functional

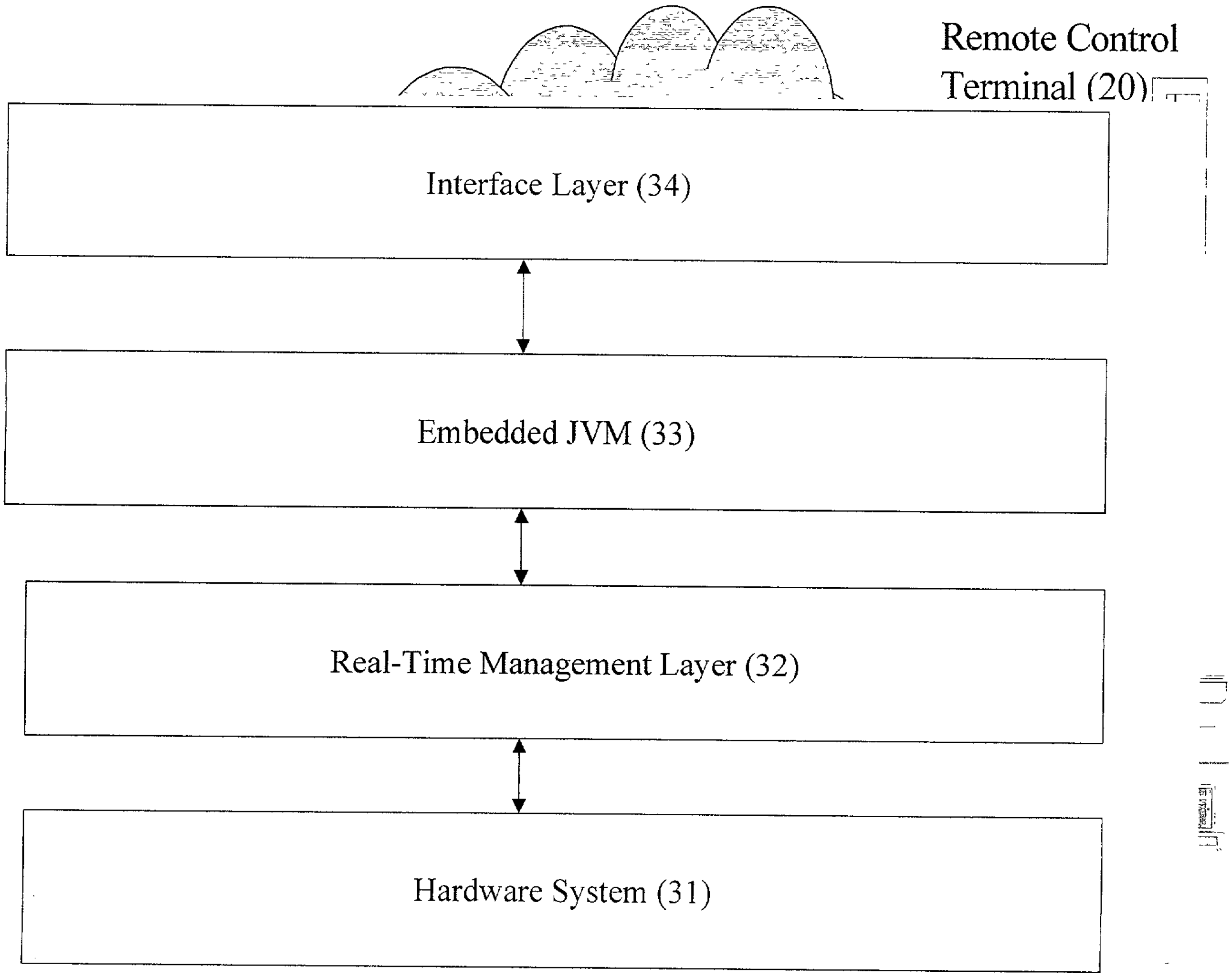

FIG. 2 Architecture of a Smart Device

FIG. 1 System Overview